

No .

7100071'



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

**Texas Agricultural Experiment Station
of the Texas A & M University**

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE-ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF *seventeen* YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT (STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

WEeping LOVEGRASS

'Renner'

*In Testimony Whereof, I have hereunto set
my hand and caused the seal of the Plant
Variety Protection Office to be affixed
at the City of Washington
this 15th day of February in
the year of our Lord one thousand nine
hundred and seventy-seven*

Attest:

[Signature]
Commissioner
Plant Variety Protection Office
Grain Division
Agricultural Marketing Service

[Signature]
Secretary of Agriculture

JUL 26 1976

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

INSTRUCTIONS: See Reverse.

1a. TEMPORARY DESIGNATION OF VARIETY	1b. VARIETY NAME Renner	FOR OFFICIAL USE ONLY	
2. KIND NAME Lovegrass, Weeping	3. GENUS AND SPECIES NAME Eragrostis curvula	PV NUMBER 7171	FILING DATE 4-13-71
4. FAMILY NAME (BOTANICAL) Gramineae	5. DATE OF DETERMINATION 1/9/64	TIME 9:30 A.M.	FEE RECEIVED \$ 250.00 \$ 250.00 \$ 250.00
6. NAME OF APPLICANT(S) Texas Agricultural Experiment Station of the Texas A & M University	7. ADDRESS (Street and No. or R.F.D. No., City, State, and ZIP Code) Texas A & M University College Station, Texas 77843	8. TELEPHONE AREA CODE AND NUMBER 214-235-7108	
9. IF THE NAMED APPLICANT IS NOT A PERSON, FORM OF ORGANIZATION: (Corporation, partnership, association, etc.) University Experiment Station		10. IF INCORPORATED, GIVE STATE AND DATE OF INCORPORATION	
11. DATE OF INCORPORATION		12. Name and mailing address of applicant representative(s), if any, to serve in this application and receive all papers: Dr. James C. Read Texas A & M University Research and Extension Center at Dallas P.O. Box 43 Renner, Texas 75079	

13. CHECK BOX BELOW FOR EACH ATTACHMENT SUBMITTED:

- ☒ 13A. Exhibit A, Origin and Breeding History of the Variety (See Section 52 of the Plant Variety Protection Act.)
☒ 13B. Exhibit B, Novelty Statement.
☒ 13C. Exhibit C, Objective Description of the Variety (Request form from Plant Variety Protection Office.)
☒ 13D. Exhibit D, Additional Description of the Variety.

14A. Does the applicant(s) specify that seed of this variety be sold by variety name only as a class of certified seed?
(See Section 83(a). (If "Yes," answer 14B and 14C below.) ☐ YES ☒ NO

14B. Does the applicant(s) specify that this variety be limited as to number of generations?

☐ YES ☐ NO

14C. If "Yes," to 14B, how many generations of production beyond breeder seed?

☐ FOUNDATION ☐ REGISTERED ☐ CERTIFIED

15. Does the applicant(s) agree to the publication of his/her (their) name(s) and address in the Official Journal?

☒ YES ☐ NO

16. The applicant(s) declare(s) that a viable sample of basic seed of this variety will be deposited upon request before issuance of a certificate and will be replenished periodically in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

JUL 23 1976

(DATE)

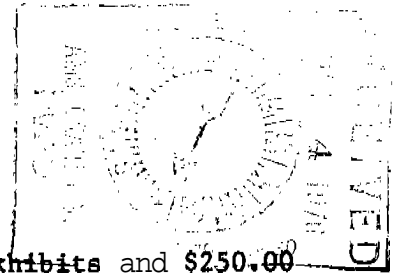
James C. Read
(SIGNATURE OF APPLICANT)

00001

(DATE)

(SIGNATURE OF APPLICANT)

INSTRUCTIONS



GENERAL: Send an original copy of the application, **exhibits** and **\$250.00** fee to U.S. Dept. of Agriculture, Agricultural Marketing Service, Grain Division, National Agricultural Library, Beltsville, Maryland 20705. (See Section 180.175 of the regulations and rules of practice.) Retain one copy for your files. All items on the face of the form are **self-explanatory** unless noted below.

ITEM

5 Give the date the applicant determined that he had a new variety based on (1) the definition in Section 41(a) of the Act and (2) the date a decision was made to increase the seed.

13a Give (1), the genealogy, including public and **commercial** varieties, lines, or clones used, and the breeding method. (2), the details of subsequent stages of selection and multiplication. (3), the type and frequency of variants during reproduction and multiplication and state how these variants may be identified and (4), **evidence of** stability.

13b Give a summary **statement of the** variety's novelty. Clearly **state how this novel variety** may be distinguished from all other varieties in the same crop. If the new variety most closely resembles one or a group of related varieties; (1) identify these varieties and state all differences objectively; (2) **Attach** statistical data for characters expressed numerically and demonstrate that these differences are significant; and (3) submit, if helpful, seed and plant specimens or photographs of seed and plant comparisons -- clearly **indicating** novelty.

13c **Fill in** the **Exhibit C**, [Objective] Description form for all---- characteristics, for which you have adequate data.

13d Describe any additional characteristics **that** are not described, or whose description cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the description of **characteristics that** are difficult to describe; such-as; plant **habit**, plant color, -disease resistance, etc.

14A If "YES" is specified (**seed of** this variety be sold by variety name only as a class of certified seed) **the** applicant may NOT reverse his affirmative decision after the variety has either been sold and so labeled or published or the certificate has been issued. However, if the applicant specifies "NO", he may change his **choice**. (See Section 180.15 of the Regulations and Rules of Practice.)

EXHIBIT A

ORIGIN AND BREEDING OF RENNER LOVEGRASS

Original seed of Renner lovegrass were obtained from J. J. Lower, Plant Introduction Officer, Division of Plant and Seed Control, South Africa, via USDA - Plant Introduction. The seed were labeled Eragrostis robusta and had been collected from plants growing in Basutoland, South Africa. This accession had been designated as PI 294-484 by the USDA when received by Texas Research Foundation. This was only one of fifty-four accessions received at that time.

Sixty plants each of these fifty-four accessions and the standard Ermelo lovegrass were space-planted in four replicates with fifteen individual plants per replication. The basic objective of this spaced-plant nursery was to screen all available lovegrass strains for their particular adaptability to the Blacklands of North Central Texas. Special attention was given to palatability while maintaining other desirable agronomic characteristics. Ermelo lovegrass was considered as the standard variety for the study.

A number of plant types could easily be picked from the nursery, however, genetic variation within each of these strains was non-existent. This would seem to confirm prior findings by the Cytogeneticist of Texas Research Foundation that the curvula type of lovegrass, of which E. robusta is included, reproduce apomictically. Therefore, any desirable strain could be selected and increased for further testing and subsequent release without detailed breeding procedures.

In preliminary grazing trials during the fall of 1964, animal preference for PI 294-484 was definite.

All plants of PI 294-484 were moved to the greenhouse and carried through the winter of 1965-66. In the spring of 1966, these plants were transplanted to the field for seed increase. Two seed harvests were made in 1966.

Field size plantings were made in 1967 for continued testing

ADDENDUM TO
EXHIBIT A

On September 1, 1972, the facilities and all rights to plant materials, including 'Renner' lovegrass, were transferred from the Texas Research Foundation to the Texas Agricultural Experiment Station, a part of the Texas A&M University System.

EXHIBIT B

BOTANICAL DESCRIPTION OF THE VARIETY

11/4/76
20
Seed of Renner lovegrass are reddish brown with a black hilum. ~~There are approximately three million seed per pound.~~ They are easily distinguished from Ermelo and common weeping lovegrass seed which are translucent, brownish with a light to black hilum. There are about two million seed per pound of Ermelo and common weeping lovegrass.

Seedlings of Renner lovegrass and common weeping lovegrass are similar until about six weeks growth is attained. The blue-green color of Renner lovegrass as compared to bright green for Ermelo and common weeping lovegrass then becomes apparent.

In the fruiting or seeding stage, another marked difference is apparent. Ripening seed of Renner lovegrass becomes exposed as if the lemma and palea falls away, whereas seed of Ermelo and common weeping lovegrass remain enclosed in these plant parts. Obviously, seed of Renner lovegrass are much more prone to shattering.

Mature plants of Renner lovegrass develop into large stalky clumps. Stooling begins soon after planting with new shoots arising just below surface of the ground.

Leaves are broad (up to 6 mm wide) compared to those of Ermelo and common weeping lovegrass which are typically less than 4 mm. Renner lovegrass leaves are blue-green on both surfaces while those of Ermelo and common weeping lovegrass are bright green. Culm leaves make up a relatively large part of the foliage of Renner lovegrass.

Seed stalks develop early and are produced throughout the growing season. Two or more good seed crops per year are easily produced by Renner lovegrass when conditions are favorable, whereas only one crop per year, even under irrigated conditions, is produced by Ermelo lovegrass.

Seed heads are large (12-15 inches long) with widely spaced primary branches. The inflorescence of Ermelo and common weeping lovegrass varies from 6 to 10 inches in length.

00004

ADDENDUM TO

EXHIBIT B

The seeds of 'Renner' lovegrass are distinctive and easily identified from 'Ermelo', 'Morpa', common (source trace to A67), and 'Catalina'. The seed of 'Renner' are reddish brown where all the other varieties are translucent. Also, 'Renner' seed are smaller than 'Ermelo', common, and 'Morpa', but slightly larger than 'Catalina' (Table 1).

Mature plants of 'Renner' are also easily distinguished from all other varieties. 'Renner' plants are blue-green in color where all the others are green.

Table 1. Seed size of the weeping lovegrass varieties.

Variety	No. seed measured	Length mm.	s.d.	Width mm.	s.d.
Ermelo	35	1.401	.0178	.7036	.0564
Common	31	1.265	.1121	.6424	.0762
Morpa	25	1.217	.1224	.5948	.0760
Renner	32	0.926	.0674	.5478	.0372
Catalina	26	0.908	.0640	.5390	.0478

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
GRAIN DIVISION

MARCH 21, 1973

HYATTSVILLE, MARYLAND 20782
OBJECTIVE DESCRIPTION OF VARIETY
Lovegrass

7100071

(Eragrostis spp.)

1. SPECIES:

- ☒ 1 = curvula 2 = chloromelas 3 = trichodes 4 = other (specify) _____
☐ 1 = diploid 2 = tetraploid 3 = other (specify) _____

2. REPRODUCTION:

- ☒ 1 = apomictic 2 = crosspollinated 3 = other (specify) _____

3. PLANT: (at anthesis)

- ☐ ☐ days earlier than ☐
☐ ☐ days later than ☐
☐ ☐ cm tall
☐ ☐ cm shorter than ☐
☐ ☐ cm taller than ☐
☐ ☐ cm narrower than ☐
☐ ☐ cm wider than ☐
1 = A67 2 = Catalina
3 = Ermelo 4 = Morpa

- ☒ Habit: 1 = decumbent 2 = spreading 3 = erect

4. CULMS:

- ☒ 1 = simple 2 = branched
☒ 1 = no rooting at nodes 2 = rooting at nodes
☒ 8 average number of culms per plant
☒ anthocyanin: 1 = absent 2 = present
☒ hairiness: 1 = glabrous 2 = sparsely hairy 3 = densely hairy

5. LEAF SHEATH:

- ☒ Basal leaf sheath: 1 = glabrous 2 = pubescent
☒ anthocyanin in leaf sheath: 1 = absent 2 = present
☒ Nerves in leaf sheath: 1 = inconspicuous 2 = prominent

6. LEAF BLADE:

- ☒ 1 = narrow filiform 2 = broad expanded 3 = other (specify) _____
☒ 1 = flat 2 = subinvolute 3 = involute
☒ 1 = spreading 2 = arcuate 3 = curled
☒ 1 = glabrous 2 = pubescent on lower surface
3 = pubescent on upper surface 4 = pubescent
☒ 4 mm width of flag leaf
☒ 2 cm length of flag leaf

7. INFLORESCENCE:

- ☒ 2 cm panicle width
☒ 3 cm panicle length
☒ Branch angle with central stalk: 1 = 0-45° 2 = 45-60°
3 = 60-75° 4 = 75-90°
☒ Anthocyanin in inflorescence: 1 = absent 2 = present
☒ 8 no. flowers per spikelet
☒ spikelets: 1 = appressed to branches 2 = spreading

00006

14 mm spiklet width
 55 mm spiklet length

7100071

8. SEED:

92 mm long
 211 mg. per 1000 seed
 florescence:

1 = absent

2 = present

9. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED FOR THE CHARACTER LISTED:

CHARACTER	VARIETY	CHARACTER	VARIETY
growth habit		leafiness	
persistance		drought tolerance	
cold tolerance		palatability	
winter growth			

10. GIVE ANY INSECT OR DISEASE RESISTANCE

11. GIVE TESTING AREA FOR DATA PRESENTED

Texas A&M University Research & Extension Center, Renner, Texas

00007

EXHIBIT D

PARTICULARS OF TRIAL PERFORMANCE

The following testing information is included:

- I. 1969 Grazing and other data.
- II. 1970 Grazing data.
- III. 1970 Weekly crude protein readings.
- IV. Various photographs which are labeled and should be self-explanatory.
- V. Seed samples of Renner lovegrass (E. robusta) and Ermelo lovegrass (E. curvula) which were used as a standard of comparison.

00008

Exhibit D. I. 1969 Grazing and Other Data.R-32 - Steer Grazing - Renner Lovegrass - Field 27-A.

Renner Lovegrass was established by seeding in the spring of 1968. Row middles were plowed in 1968 to control weeds and a 1968 spraying of arsenic was utilized to control Johnson grass. In 1968 the field was combined for seed and fall mowed.

Fertilizer was applied at the rate of 71-58-0 on April 7, 1969. On August 25, 1969, the field was uniformly mowed at 8-9 inches and nitrogen was applied at the rate of 48 pounds per acre.

The grazing trial was conducted with the dual goal of evaluating both yield and quality of herbage. To accomplish this, the number of animals were periodically adjusted to compensate for the changes in the rate of herbage growth. Animal production calculations were patterned after the Peterson and Lucas method and the Van Soest method was used for forage analyses. Two uniform testers were assigned to the trial for its duration. Each tester was weighed at the beginning, at periodic intervals as regulators were added or taken away and at the end of the trial. Regulator animals were also individually weighed. All weighings were made after 16 hours of dry-lotting.

Grazing began on April 18 and ended on August 4, 1969, for a total of 108 days. Summary of grazing results for the trial are as follows:

<u>Measure of Performance</u>	<u>Estimated by Tester Technique</u>	<u>Observed All Animals</u>
Daily gain, lbs./day	0.67	0.77
Carrying capacity, animal days 1 acre	302	287
Total gain, lbs. beef/acre	202	221

Adverse weather conditions during June, July, August and September severely reduced herbage growth and limited beef production. However, for the season, the carrying capacity and pounds of beef per acre appear to be satisfactory.

In anticipation of more favorable weather conditions to produce substantial regrowth and to uniformly utilize this regrowth, the field was divided into half for rotational grazing. On October 20, grazing was again commenced. By November 7, most available forage (that above the stubble) had been consumed on both paddocks and the animals were dry-lotted and weighed. A weight loss was obtained during this period not only by the testers but by all animals.

00009

On November 8, all fences were removed and the animals had access to Tejas Indian grass, as well as Renner Lovegrass stubble. They were removed and weighed on December 2 (24 days) with a total gain of 435 pounds of beef, or a daily gain of 0.82 pounds of beef per day per animal unit.

Herbage samples were taken at periodic intervals, commencing in January, 1969. The samples were weighed, dry matter determined (Table 16), ground and stored in the cold room in the seed lab. Because of non-uniform temperature and humidity conditions in the cold room, many of the samples were infected by mold and could not be utilized.

Protein (Table 16) and phosphorus (Table 17) composition, in general, indicate that the pasture did not receive adequate fertilizer. Dry matter content did not start to indicate the adverse weather conditions until August 5. Magnesium, in all instances (Table 17), is low but not severely low. This could possibly mean "hidden hunger" and thereby influencing phosphorus metabolism, translocation and photosynthesis.

The forage analyses (Table 18) indicate a good quality grass (a high hemicellulose to lignin ratio). The high cell-wall content tends to indicate a probable low animal intake of the forage and digestibility, In-vitro analyses should be determined. (High cell-wall content and low degree of lignification promotes a high fiber digestibility).

The average Estimated Net Energy for the grazing period, 27.81 therms/100 lbs. dry matter, is 10 therms/100 lbs. of dry matter lower than cured Eragrostis curvula hay. Herbage collected in July and August, 1969, had extremely low Estimated Net Energy and TDN values and these indicate, for 1969, that July and August are poor grazing months.

Further grazing and laboratory investigations are needed.

Table 16. Protein and Dry Matter Composition of Renner Lovegrass -- Grazing Experiment -- Field 27A - 1969.

Date ^{1/}	Crude Protein %	Dry Matter %
February 1969	7.7	82.9
March 1969	7.9	82.5
April 1969	10.6	50.1
May 1969	11.6	34.9
July 1969	6.4	44.8
August 1969	4.5	60.8
October 20, 1969	10.3	40.8
October 31, 1969	11.3	40.8

^{1/} Samples were taken on 30-day intervals except for October 1969.

Table 17. Mineral Composition Renner Lovegrass - Grazing Experiment -
Field 27-A - 1969

Date ^{1/}	P %	Ca %	K %	Mg %	Zn ppm.
February 1969	0.091	0.583	0.293	0.058	2.1
March 1969	0.099	0.527	0.324	0.059	1.2
April 1969	0.144	0.628	0.756	0.078	1.1
May 1969	0.176	0.589	1.32	0.091	2.2
July 1969	0.136	0.577	1.02	0.077	3.1
August 1969	0.099	0.626	0.82	0.065	3.0
Oct. 20, 1969	0.138	0.710	1.00	0.064	1.9
Oct. 31, 1969	0.155	0.758	1.02	0.071	2.0

^{1/} Samples taken on 30 day intervals except for October 1969.

Table 18. Forage Analysis of Renner Lovegrass - Grazing Experiment -
Field 27-A - 1969

Percent of Dry Matter					
Date	Cell Wall	Solu- bles	NDF Ash	ADF	Lignin
March 1969	74.7	25.3	2.24	42.0	6.1
April 1969	72.8	27.2	2.47	41.1	5.9
May 1969	69.0	31.0	1.63	39.7	5.0
July 1969	78.1	21.9	1.35	43.2	6.8
August 1969	75.8	24.2	1.40	42.8	6.9
Oct. 20, 1969	73.3	26.7	0.92	37.2	5.3
Oct. 31, 1969	73.4	26.6	1.01	36.8	5.6

Percent of Dry Matter				E.N.E., Therms	T.D.N. %
Date	SiO ₂	Hemicel- lulose	Digestible Dry Matter	100 Lbs. Dry Matter	
March 1969	3.88	42.7	66.4	27.80	44.8
April 1969	4.22	41.8	67.4	31.70	47.6
May 1969	3.55	37.9	72.2	42.83	55.7
July 1969	1.82	43.5	62.7	14.41	35.2
August 1969	2.18	42.1	63.2	19.58	38.9
Oct. 20, 1969	1.48	42.9	67.2	30.79	47.0
Oct. 31, 1969	1.36	43.6	65.8	27.62	44.7

LIVESTOCK GRAZING DATA - 1970

	1st. Period	2nd Period	3rd Period	4th Period	Total
Pasture No.	27A	→	→		27A
Grass	Renner Inc	→	→		Renner Inc
Fertility	100-50-0				100-50-0
Acres	5.9	5.9	4.7		
No. of Animals	17	16	17		
Stocking Rate	2.9	2.7	3.6		
Date On	5-5-70	6-24-70	9-2-70		
Date Off	5-26-70	7-16-70	10-27-70		
Days Grazed	21	23	55		99
Grazing Days/Acre	61	62	199		322
Weight On	6,560	7,410	8,100		
Weight Off	7,280	7,920	8,535		
Total Gain	720	510	435		1,665
Lbs. Gain Per Head Daily	2.02	1.45	0.46		
Lbs. Beef Per Acre	122	86	93		301

EXHIBIT D - II

00012

7100071

EXHIBIT D - III. Crude Protein Content - Renner Lovegrass - 1970

<u>Date Sample Taken</u>	<u>% Protein</u>
5-8-70	11.94
5-15-70	9.34
5-22-70	7.54
5-29-70	7.41
6-5-70	7.63
6-12-70	7.87
6-19-70	11.7
6-26-70	10.3
7-2-70	10.0
7-15-70	8.5
7-24-70	6.81
7-31-70	7.44
8-17-70	7.56
8-21-70	8.00
8-28-70	7.56
9-4-70	9.31
9-18-70	8.06
9-25-70	9.19
10-2-70	9.38
10-9-70	8.62
10-16-70	9.19
10-21-70	9.19
10-30-70	7.50
11-24-70	8.94
12-4-70	9.19
12-18-70	8.62
12-31-70	8.76

00013

R. L. Dalrymple, Agronomist
Mike Payne, Research Technician
E. C. Holt, Professor of Forage¹
Agricultural Division - Noble Foundation
Route One
Ardmore, Oklahoma 73401

7100071

There are four weeping lovegrass (*Eragrostis curvula*) varieties available commercially: "Common," Ermelo, Morpa, and Renner. Comparisons were initiated during 1973 to determine yields, quality, and various characteristics of the four varieties at three fertilization levels. Certain summarized data from these replicated plots are reported herein.

PROCEDURE

The soil on this plot location is a deep Minco fine sandy loam. The seedbed for weeping lovegrass planting was prepared by disking and spike-tooth harrowing to a level very firm seedbed.

All varieties were planted on May 18, 1973 at two pounds pure live seed per acre with a John Deere LZ-B hoe drill equipped with a grass seed box. Seed and banded starter fertilizer of 16-20-0 at 100 pounds per acre were banded in ten-inch rows on the freshly prepared soil surface. The rows were pressed firm by the drill press wheels. Rains resulted in slight siltation over the seed-fertilizer row for ideal coverage and excellent stand development. This is an excellent method of planting weeping lovegrass in field conditions.

Each variety has been fertilized with three levels of fertilization: low, medium, and high (Table 1). Levels are based more on frequency rather than various rates per date of application. The low level received only spring application, the medium level received spring and late summer applications, and the high level received the spring application plus an application after each growing season harvest. The area is managed as dryland, but the plots were irrigated once during July 1974 to preserve the stand during a severe dry period.

¹E. C. Holt is professor of forage at Texas A&M University, College Station, Texas, and is responsible for obtaining the digestible dry matter of samples in this study.

Samples are clipped from each plot with a mower set to cut and leave a four-inch stubble. All growth is cut and removed from the plot. Late summer regrowth is left on the plots during winter. This aftermath is burned during late winter to early spring under moist soil conditions.

GENERAL VARIETY OBSERVATIONS

"Common"

This designation is not a variety, but it is basically unselected stock derived from early introductions. The Common seed planted in these plots traces back to early introductions. It had better seedling vigor than other varieties in these tests. Common is slightly shorter and weeps over more readily than other varieties. Leaf tips brown sooner due to moisture stress, temperature stress, and maturity than other varieties. However, it remains greener in the clump than Ermelo or Morpa. Common greens slightly earlier some springs than all other varieties and it remains green in the clump later during early winter than Ermelo and Morpa.

Ermelo

Texas Research Foundation (now Texas A&M University Research and Extension Center at Dallas) released this variety many years ago as being more palatable than Common. It is basically the same type of plant as Common, but it is slightly taller, often darker green, has slightly wider leaves, and is three to five days later in reaching heading stages. Ermelo is slightly earlier in heading than Morpa and it retains a greater amount of greenness. Ermelo and Morpa are very similar varieties.

Morpa

Oklahoma State University and USDA, Woodward, Oklahoma, released Morpa in recent years as being better in palatability and ability to produce beef gains than Common. It is the same basic type of plant as Common. Morpa is up to six to eight days later in heading stages than Common. It appears very slightly more palatable and taller than Ermelo. Morpa browns more severely and completely during drought and cold stress than any other variety. It was the only variety that sustained drought injury during 1974 under high fertility. Morpa is readily available as certified seed.

Renner (*Eragrostis robusta*)

Texas Research Foundation (now Texas A&M University Research and Extension Center at Dallas) released Renner as being more palatable than Ermelo. Renner is a much more robust, semi-erect, dark green to blue-green weeping lovegrass with a wider leaf than all other varieties. Renner is sometimes later in spring green up by up to over one week. Renner is almost always greener than other varieties and is much more so during mid to late summer up to mid winter (Figure 1). It reaches heading stages



Figure 1. Renner and Morpa weeping lovegrass during late summer when Renner retains more greenness.

earlier than all other varieties by up to one week. This is not a problem in well implemented grazing or haying programs. Renner seems to volunteer much more profusely than other varieties and it is more competitive due to its more semi-prostrate dense crown. It is often slightly harder to mow. It seems to grow better on loam soils and may not do as well as others on very deep coarse sands. Renner has a more abundant root system than Morpa in the upper 18 inches of soil. Renner is the least cold hardy of the varieties but it survives excellently into central Oklahoma. Renner seed is one-third to one-half the size of other varieties and it is a dark rusty-red (maroon) color.

RESULTS

Forage Yields

Three years of forage yields are presented in Tables 2A to 2C. Renner under better fertility levels yielded much higher than the others the first year (Table 2A). Second year yields varied from 7,553 pounds per acre for Morpa under low fertility to 15,610 pounds per acre for Ermelo under high fertility (Table 2B). Renner under high fertility was second highest yielding.

Third season yields varied from 5,903 pounds per acre for Renner under low fertility to 11,603 pounds per acre for Common under high fertility. Vigor of all grasses was much better under the medium fertility level.

Three-year totals or averages show that overall Renner has been the best producer, however, it has been the lowest producer under low fertility levels. Under high and medium fertility, Renner has produced a total of 7,500 and 1,737 pounds per acre more than Morpa for three years. Under low fertility, Morpa has produced 468 pounds more than Renner.

Renner has a greater fall production under fall (August) fertilization than Morpa. Renner under medium fertility produced 2,231 pounds per acre due to fall topdressing compared to 1,754 pounds per acre from Morpa. Under high fertility the response was less but Renner produced 2,059 pounds per acre compared to 807 pounds per acre from Morpa. If a producer is to employ fall topdressing Renner has obvious advantages.

Due to quality and yield relationships we presently consider Morpa and Renner as the top two varieties. Each of these varieties has characteristics that can be considered advantageous over the other. They are different enough to be considered as separate forage components in a forage system.

Yield Relationships

Forage yields of Tables 2A to 2C were converted to percentages to illustrate more generally the relationship of yields between the varieties (Table 3). Morpa was used as the check (100%). In five of nine comparisons, Renner was better than Morpa. In 22 of 27 comparisons, Morpa was inferior to the other three varieties.

Renner was much better than Morpa the first and second season. By the third season the differences were not as great. It seems, from this and other data, that Renner has much better production potential than Morpa where nitrogen and soil moisture are sufficient. Where either input is limited, production is possible only up to that limit and the full potential of the grass will not surpass the limiting factor. To more fully understand this we might use the analogy--a bull is capable of 4.0 pounds average daily gain on full feed. However, he cannot show that potential on just enough feed and/or water to produce 2.0 pounds average daily gain. Forage, such as weeping lovegrass, has these potentials and restrictions just as well.

Crude Protein

Average protein content of all harvests is presented in Table 4. The data does not show drastic differences in overall average protein values, however some differences can be determined from study of the data. A major point is even though Renner produced more grass under medium and low fertility than did Morpa, its protein values remained very close to that of Morpa.

As forage managers -- take special note of how protein values continue to decline from spring to fall under low fertility. Under medium fertility, the fall topdressing elevates the protein level appreciably. Under high fertility where regular nitrogen was applied, protein levels remained quite uniform throughout summer.

This tabulated data does not show all. Protein levels under low fertility during the growing season dropped to as low as 4.3%. This is severely nitrogen deficient and low quality pasture.

Digestible Dry Matter (DDM)

In vitro digestible dry matter determinations were made by Texas A&M University (Table 5). Common and Ermelo samples were not analyzed throughout the study. These varieties must be compared under spring and fall harvests only between the two varieties. The same is true for Morpa and Renner. Summer harvests presented here can be compared for all four varieties.

When comparison is made throughout the samples, the varieties in order of digestible dry matter are: Renner, Morpa, Ermelo, and Common. Early spring growth, that would be early grazing in pastures, averaged about 65% to 66% DDM. Severely frozen, lowest quality midwinter dry grass averaged 28% DDM for Morpa during 1976 to 38% DDM for Renner for the same period. January 1976 produced the lowest DDM. Mild February 1976 allowed some greenness to develop and DDM rose to 45% to 46% for Morpa and Renner respectively. Early winter DDM values averaged about 50%.

Quality Yield Per Acre

Time has not permitted full development on figures of pounds protein of digestible dry matter per acre. However, it is obvious that Renner will be the highest by a wide margin. Morpa will likely be second, but Ermelo and Morpa will be close.

Table 1. Fertilizer Treatment Levels for Weeping Lovegrass Variety Plots.
Red River Demonstration and Research Farm. Noble Foundation.
Ardmore, Oklahoma.¹

Application Dates	Fertilization Levels (Lbs/Acre, N-P-K)		
	Low (L)	Medium (M)	High (H)
<u>1973 Applications</u>			
May 18 (banded starter)	16-20-0	16-20-0	16-20-0
July 13		51-0-0	51-0-0
August 17			50-0-0
Total	16-20-0	67-20-0	117-20-0
<u>1974 Applications</u>			
March 14	70-20-20	70-20-20	70-20-20
May 2			70-0-0
June 12			70-0-0
July 9			70-0-0
August 29		70-0-0	70-0-0
Total	70-20-20	140-20-20	350-20-20
<u>1975 Applications</u>			
March 14	70-0-0	70-0-0	70-0-0
May 13			70-0-0
June 18			70-0-0
August 20		70-0-0	70-0-0
Total	70-0-0	140-0-0	280-0-0

¹No fertilizer will be applied during 1976 and harvests will be made to determine relative residual effects of previous applications.

Table 2A. Yields of Four Weeping Lovegrass Varieties at Three Fertility Levels. Red River Demonstration Farm. Noble Foundation. Ardmore, Oklahoma. 1973.

Variety	Fertility Level	Lbs/Acre Oven-Dry			Total
		7-17	8-17	10-22	
Common	L	934	2572	2585	6091
	M	934	2837	2280	6051
	H	934	2837	2591	6362
	Avg.	934	2705	2485	6168
Ermelo	L	861	2591	1978	5430
	M	861	2970	1843	5674
	H	861	2970	2108	5939
	Avg.	861	2781	1976	5681
Morpa	L	932	2647	2043	5622
	M	932	2966	1811	5709
	H	932	2966	1893	5791
	Avg.	932	2807	1916	5707
Renner	L	1005	2956	1896	5857
	M	1005	3736	2649	7390
	H	1005	3736	5056	9797
	Avg.	1005	3346	3200	7681

00020

Table 2B. Yields of Four Weeping Lovegrass Varieties at Three Fertility Levels. Red River Demonstration and Research Farm. Noble Foundation. Ardmore, Oklahoma. 1974.

Variety	Fertility Level	Lbs/Acre Oven-Dry					Total
		5-2	6-11	7-9	8-28	11-18	
Common	L	2678	1957	937	1448	772	7792
	M	2753	2069	1400	1550	2390	10162
	H	3366	2971	3048	2274	2230	13889
	Avg.	2932	2332	1795	1757	1797	10614
Ermelo	L	3018	1832	1022	1296	696	7859
	M	2726	1877	1074	1526	2738	9940
	H	3937	3536	3567	1969	2601	15610
	Avg.	3227	2413	1888	1597	2012	11136
Morpa	L	3114	1554	937	1164	784	7553
	M	2704	1606	1243	1667	2467	9687
	H	2862	2555	2931	1961	1774	12083
	Avg.	3080	1905	1704	1597	1674	9774
Renne r	L	2519	1644	789	1135	607	6694
	M	2977	1504	926	1060	2732	9199
	H	3291	2743	2768	2097	3949	14848
	Avg.	2929	1963	1495	1431	2429	10247

Table 2C. Yields of Four Weeping Lovegrass Varieties at Three Fertility Levels. Red River Demonstration and Research Farm. Noble Foundation. Ardmore, Oklahoma. 1975.

Variety	Fertility Level	Lbs/Acre Oven-Dry					3 Year Lbs/Acre OD	
		5-18	6-18	8-20	11-18	Total	Total	Average
Common	L	3352	1897	1011	705	6965	20848	6949
	M	3497	2751	1311	2333	9892	26105	8702
	H	3693	3813	2872	1225	11603	31854	10618
	Avg.	3514	2820	1731	1421	9486	26268	8756
Ermelo	L	3104	1977	1219	649	6949	20238	6746
	M	3214	2487	1382	2576	9659	25273	8624
	H	3127	4065	2946	1254	11392	32941	10980
	Avg.	3148	2843	1849	1493	9333	26150	8717
Morpa	L	2783	1934	990	664	6371	19546	6515
	M	3025	2056	1389	2489	8959	24355	8118
	H	3213	3354	2400	1287	10254	28128	9376
	Avg.	3007	2448	1593	1480	8528	24009	8003
Renner	L	2653	1835	930	505	5903	18474	6158
	M	3275	2285	1102	2841	9503	26092	8697
	H	3062	3851	2810	1260	10983	35628	11876
	Avg.	2997	2657	1614	1535	8803	26730	8910

00022

Table 3. Yield Relationship of Four Weeping Lovegrass Varieties at Three Fertility Levels. Red River Demonstration and Research Farm. Noble Foundation. Ardmore, Oklahoma.

Variety	Fertility Level	% of Morpa at Each Fertility Level			
		1973	1974	1975	3-Year Average
Common	L	108	108	109	107
	M	106	105	110	107
	H	110	115	113	113
	Avg.	108	109	111	109
Ermelo	L	97	104	109	104
	M	99	103	108	106
	H	103	129	111	117
	Avg.	100	114	109	109
Morpa	L	100	100	100	100
	M	100	100	100	100
	H	100	100	100	100
	Avg.	100	100	100	100
Renner	L	104	89	93	95
	M	129	95	106	107
	H	169	123	107	127
	Avg.	135	105	103	111

00023

Table 4. Crude Protein Content of Four Weeping Lovegrass Varieties at Three Fertility Levels. Red River Demonstration and Research Farm. Noble Foundation. Ardmore, Oklahoma.

Variety	Fertility Level	% Crude Protein ¹		
		Spring Harvests	Summer Harvests ²	Fall Harvests
Common	L	10.6	7.9	6.7
	M	10.8	7.6	8.3
	H	11.1	11.2	9.6
	Avg.	10.8	8.9	8.2
Ermelo	L	11.8	9.1	6.4
	M	11.5	7.8	9.0
	H	12.9	11.5	10.2
	Avg.	12.1	8.4	8.5
Morpa	L	11.4	8.0	6.5
	M	12.0	8.0	8.4
	H	12.1	11.7	10.5
	Avg.	11.8	9.2	8.5
Renner	L	11.2	7.5	5.8
	M	11.2	7.7	7.8
	H	11.2	11.2	9.0
	Avg.	11.2	8.8	7.5

¹Three-year average.

²Total of six harvests during three summers.

Table 5. Digestible Dry Matter of Four Weeping Lovegrass Varieties at Three Fertility Levels. Red River Demonstration and Research Farm. Noble Foundation. Ardmore, Oklahoma.

Variety	Fertility Level	% Digestible Dry Matter		
		Two Spring Harvests ¹	Five Summer Harvests	Three Fall Harvests ²
Common	L	59.6	53.3	49.2
	M	59.6	54.7	48.3
	H	59.6	54.1	51.3
	Avg.	59.6	54.0	49.6
Ermelo	L	59.8	55.3	53.4
	M	59.8	56.4	50.1
	H	59.8	56.1	52.9
	Avg.	59.8	55.9	52.1
Morpa	L	62.0	56.8	44.1
	M	61.9	57.7	42.3
	H	61.3	57.6	46.7
	Avg.	61.7	57.4	44.4
Renner	L	60.2	56.4	45.0
	M	57.7	58.7	49.8
	H	59.2	61.1	49.2
	Avg.	59.0	58.7	48.0

¹One harvest only on Common and Ermelo; do not compare directly with Morpa and Renner values.

²Two harvests only on Common and Ermelo; do not compare directly with Morpa and Renner values.

00025

Table 6. An Example of Crude Protein and Digestible Dry Matter Content of Morpa and Renner Weeping Lovegrass When Renner Contained More Green Grass. Red River Demonstration and Research Farm. Noble Foundation. Ardmore, Oklahoma. September 20, 1975.

Variety	Fertility Level	% Crude Protein	% Digestible Dry Matter
Morpa	L	6.2	43.6
	M	12.0	46.6
	H	10.8	49.4
	Avg.	9.7	46.5
Renner	L	6.8	50.6
	M	10.9	62.0
	H	9.5	58.0
	Avg.	9.1	56.9

00026

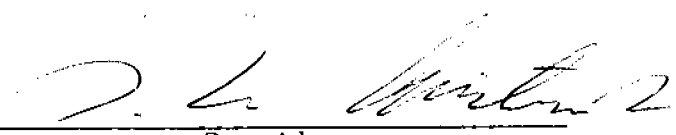
TEXAS RESEARCH FOUNDATION, a Texas nonprofit corporation, of Renner, Texas, for and in consideration of the sum of ONE DOLLAR (\$1.00) cash in hand paid to it, the receipt and sufficiency of which consideration are hereby acknowledged, and pursuant to its Plan of Dissolution, has distributed, transferred, assigned and delivered, and does hereby distribute, transfer, assign and deliver to TEXAS AGRICULTURAL EXPERIMENT STATION OF THE TEXAS A&M UNIVERSITY SYSTEM all of the following assets and properties:

1. Application for Plant Variety Protection Certificate dated April 8, 1972 and assigned No. 7171 by the Plant Variety Protection Office, relative to the Variety "Renner Lovegrass";
2. All outstanding contracts pertaining to said application or said Certificate;
3. All royalties pertaining to or connected with "Renner Lovegrass"; and
4. All outstanding contracts, applications, trademarks, patent rights and royalty rights pertaining to or connected with "Renner Lovegrass" or any other seed or plant heretofore grown or discovered by TEXAS RESEARCH FOUNDATION.

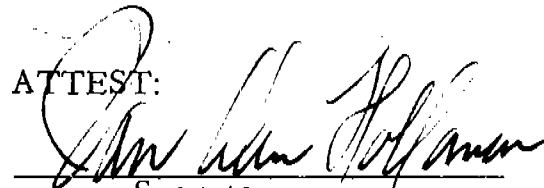
EXECUTED as of September 1, 1972.

TEXAS RESEARCH FOUNDATION

By


President

ATTEST:


Secretary

00027